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ABSTRACT

This paper seeks to define the relationship between speech and writing as two separate media within language, and suggests the use of the term translation to describe moving from one medium to another. Such a view acknowledges the independence of speech and writing, the possibility of translation in either direction, the possible untranslatability and ambiguity of some elements, and correspondence with patterns observed in translation between languages. After a discussion of the translation theory, the author describes translation systems used in natural languages throughout the world. These include simultaneous but discrete translation of phonological features, context-based transcription, phonology-based transcription, syllable-based transcription, transcription based on a fully syllabic script, transcription based on alphabetic syllabaries, and mixed transcription. Concluding remarks concern the work of linguists in devising transcription systems for various language problems. (VM)

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MODES OF TRANSCRIPTION IN NATURAL LANGUAGES

C. V. Taylor

1. THE INTERRELATION OF PHONEMES AND GRAPHEMES REGARDED AS TRANSLATION

In a paper delivered at the 1967 Meeting of the British Linguistics Association, Professor Haas (Manchester) compared the relationship of speech to writing with that obtaining between languages in translation[1]. In my preamble I borrow a few points from this paper, but the rest of the presentation is my own responsibility. With respect to the underlying assumption that speech and writing may be regarded as independent, parallel manifestations of language, it is worth quoting Professor Abercrombie (Edinburgh) as having moved over the years from a position in 1937 when he could write 'It is an elementary, but often forgotten, fact that speech is primary'[2] through 1951, when he wrote: '...writing is a medium for language in its own right... (and) the aim of writing is not, usually, to represent actual spoken utterances which have occurred',[3] to 1967, when he writes: 'can it be said that the aural medium is primary in any other than a genetic sense? Probably not. Once another medium, a visual one, for example, has been created, it will assume full autonomy as a vehicle for language.'[4].

We may ignore here the philosophical implications of non-biuniqueness and assume that it is always possible in examining linguistic data to set up theoretical correspondences in the absence of specific matching raw material. If, then, we regard the relationship of phonemes to graphemes as that of correspondence between

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types of sounds and types of letters, we find that a phonemic notation aims at, but rarely attains, a one-one match with actual phone types. One might at this point ascribe asymmetry in phonemic notation to psychological factors in the recognition of phonemic differences. With graphemic notation there is a many-one relationship, only too evident in English graphology, but observable even in the most 'regular' of scripts. The correspondence, such as it is, then, is not in any sense a one-one correspondence; it is just as non-discrete as that of signs to meaning.

If we try to describe graphemes and phonemes in semantic terms, we may wish to consider graphemes as referential in relation to phonemes. We see a proportion between 'cats in our experience' and 'the word "cat"' which matches the proportion between 'the sound /kæt/' and 'the written form cat'. Cats humanity has experienced presumably always occur historically before the word cat; likewise the sound /kæt/ normally occurs before the written form cat. But, just as words may be said to 'exist' independently of experiences, so writing exists independently of speech. The fact that, so far as we know, writing systems have not appeared without being based in some way upon speech, does not mean they could not do so; alternatively it might mean that we have decided to define writing as a system of graphic communication based on speech, in which case of course the argument is circular. But writing can in fact go on independently of speech.

If the relationship is not exactly one of correspondence and reference, what then is it? There is a third possibility which we may call a 'translation relationship'. Writing is translated into speech; speech is translated into writing. It is certainly possible to regard speech and writing as two 'languages'. Readers of Latin have no need to consider Latin speech in order to derive information, pleasure or pain from their reading. That such effects are obtained through a kind of 'internalised speech' in some way or other is irrelevant, since if speech were absolutely basic and necessary there would be no understanding apart from such reconstructions. Perhaps the whole process is best seen this way: phonemes refer to phones and graphemes to 'graphs' or written shapes, but neither pair necessarily 'refers' to the other. The third element in the process is the translation or what can be called the mapping element, e.g. of phonemes to graphemes in writing, of graphemes to phonemes in reading.

The 'translation' view, argued against by Catford, as we shall see later, makes a number of interesting points:

(i) The mutual independence of speech and writing is maintained.

(ii) There is a symmetry in the correspondence relation in that, while a referential theory points only one way, the translation principle may be invoked in either direction.

(iii) Translation is not a perfect relationship. Some spoken areas like intonation seem untranslatable into writing, just as some written symbols are ambiguous, like the plural morpheme symbol.

(iv) Ambiguity, however, is a matter of translation, not something within the system, any more than English got is ambiguous because some Americans use both got and gotten in complementary distribution. Neither can we say that plural 's' and possessive 's' are synonyms in writing any more than we can say that 'ointment' and 'polish' are synonyms in English because several African languages use the same word for them.

(v) We find correspondences with patterns observed in translation between languages, e.g. two words for one (jeune fille - girl) corresponding with digraphs like 'ph' for /f/, 'th' for /θ/; discontinuity (he takes it out - il le sort) corresponding with spellings like 'jute' for /dzut/ where 'u...e' translates /u/; areas of reversed sequence (il le vit - he saw it) corresponding with 'wh' in some varieties of English.

2. POSSIBLE OBJECTIONS

It is obvious that any linguistic theory which sets up a continuity of units between substance and form will reject Haas's explanation: thus both the American structuralist and transformational theories, proceeding as they do from phoneme to morpheme, would find it hard to accept the translation analogy. Strictly speaking, 'phoneme' is form accounted for in terms of substance, while 'morpheme' ignores substance, but even so there is a problem in analogising from a correspondence in which one term is wholly formal to one in which there is a skewed relationship.

Halliday's system[5] would at first sight appear to avoid this dilemma by demarcating clearly the boundaries between substance and form. However, Halliday's descriptions of general form and substance-based form (his 'interlevel') do not correspond in terms of units, particularly as regards the number of units and as between ranks, e.g. clause versus tone-group. On the other hand his translation theory is spelled out in terms of 'rank boundedness' which does argue for the comparative discreteness of units and so could provide a framework for a correspondence system of a non-skewed type.

3. PHONOLOGICAL AND GRAPHOLOGICAL TRANSLATION

Catford agrees with Abercrombie in seeing language as something independent of media when he describes language as patterned behaviour and adds 'the pattern ... is the language'[6]. He distinguishes as a separate process what he calls 'phonological translation' between two languages, as when someone 'speaking French with an English accent' is so described, and is not said to be 'speaking English with French grammar and lexis'[7]. We can thus distinguish phenomena such as English /h/ translated into Greek /x/ by Greek speakers of English, or even by English imitators of Greek speakers of English, who might then be seen more easily as fully 'translating phonologically'. Catford also identifies 'graphological translation' and provides the example of Russian СПУТНИК translated into Roman script as 'CHYTHNK'. From this we see at once that graphological translation is not identical with his third category 'transliteration', which is a complex relationship involving three translation moves.

(a) Graphemes of language A into phonemes of language A;

(b) Phonemes of language A into phonemes of language B;

(c) Phonemes of language B into graphemes of language B.

But Catford says: 'Translation between media is impossible, (that is, one cannot "translate" from the spoken to the written form of a text or vice versa)' because the theory 'posits' "relationship to the same substance" as the necessary condition of translation equivalence'[8]. Catford is here speaking entirely in terms of translation between 'languages' and so this does not run counter to Haas's use of the term 'translation' as a useful analogue to what goes on when we move within one language between the two media.

4. SPORADIC TEXTUAL ANOMALIES

The normal organisational relationship between phonetic and graphetic substance is that between two unidirectionally sequential strings progressing uniformly. However, phonetic substance may be described as 'thicker' than graphetic - perhaps because sound waves operate in space and written marks appear on flat surfaces - in that it is more characteristic of phonetic substance to be expounded as a non-uniform simultaneity of a set of sound features. In graphetic substance the only immediately observable simultaneity is that embodied in the use of diacritics. Intonation in speech may be said to correspond to certain values of punctuation in writing, but whereas tone is simultaneous with sound quality or timbre, punctuation is sequential. Stress, however, another simultaneous feature of speech, may be translated into writing as a

special script such as italic, which to the extent that slope and different shaping represent a distinct feature, may be said to show simultaneity at this point.

There are, however, sporadic cases in written text of deviations from normal sequence such that the progress of the two media is not strictly uniform. These deviations may be in the form of omission or reversal. Omission occurs, for example, in a written form like '10th November', often read as 'the tenth of November' though perhaps this interpretation of the written form is less common than the reverse translation of a spoken form 'the tenth of November' into that written form. Of course, note-taking is a common example of fairly consistent non-parallel translation.

The other deviation form, reversal, occurs sporadically in the use of written symbols in an order opposed to that of the corresponding speech symbols, such as the use of '$3' for 'three dollars' and '16' for 'sixteen'. We also find more and more frequently such mixtures of orthography and symbol as that in '$3 million'. The '16' type occurs in many Germanic languages.

In the language of mathematics and school marking we encounter cases of semi-parallel translation, where the direction of reading is at right angles to normal, e.g. 'half' written '$\frac{1}{2}$', and 'nine out of ten' written so that 'out of' is translated by a horizontal line.

5. THE MAJOR CORRESPONDENCE TYPES WITHIN THE INTERLEVEL[9]

The remainder of this paper is devoted to a description of actual systems of media matching in use

throughout the world in natural languages. I shall examine the systems in terms of sound, meaning and script. I use 'sound' to mean any unit of sound of appropriate size for the particular matching process in question, since we do not know sufficient about rank in the absence of studies in several languages mentioned. I also need a term to indicate a unit of script identifiable as separate and self-sufficient, yet with a use not so scientifically discrete as that of 'grapheme'. I have selected the rather less 'linguistic' and more typographical term 'character'.

6. SIMULTANEOUS BUT DISCRETE TRANSLATION OF PHONOLOGICAL FEATURES

Languages differ in the extent to which they make any effort to translate phonological features other than at the basic level selected for their script. Alphabetically transcribed languages normally use punctuation nowadays to convey gross features ranking higher than the phoneme; this was not always so. Most of the languages of the world have taken over systems of punctuation from European languages. But the European languages themselves differ in the extent to which they translate the features associated with diacritics. French diacritics, for example, merely differentiate alphabetic characters, so that 'é' represents a different phoneme (or set of phonemes) from 'e'. In other cases the diacritic is phonemically redundant, as in 'à'. In Spanish, however, marked stress is indicated by a diacritic. Diacritics in German are regularly associated with phonemic difference. Italian and French both show examples of diacritics used as semantic markers, as in Italian 'è' and French 'où'. In some Romanisations of Asiatic

Languages, diacritics indicate tonal distinctions. One outstandingly different Romanisation, however, the Nationalist Chinese sponsored Gwoyeu Romatzyh, has managed to indicate tone without the use of diacritics. Educators and specialists in optics have advocated scripts which do not entail dichotomous activation of the eyes, and this lies behind arguments in East Africa for and against the use of double vowel-symbols as opposed to diacritics to indicate length in Bantu languages. It is not without significance that Catholic advisers were roughly divided between French-speaking advocates of diacritics and Dutch-speaking advocates of double-vowel-symbols.

7. CONTEXT-BASED TRANSCRIPTION

The nature of Chinese character has been described variously over the years as 'pictographic', 'ideographic' and more recently 'logographic'. These terms suggest respectively the primacy in translating speech of functional, semantic and formal criteria. All characters necessarily translate 'sound' or 'sounds', of course, so we must avoid a description based on rank, such as would be implied by a term like 'syllabogram', which in any case would apply only to Chinese, not to Japanese. The functional definition 'pictogram' is likewise weak when comparing with, say, alphabetic character, which might quite reasonably be said to 'depict' units of phonetic substance. The choice between 'ideogram' and 'logogram' is interesting in that it places the discussion within the 'contextual' interlevel of the Edinburgh linguistic school. It now depends which way we are looking, whether towards form or towards situation.

Languages which use characters to differentiate forms in the language may be said to use 'logograms'; those where they differentiate situations or, if you like, meanings may be said to use 'ideograms'. Such is in fact the broad difference between the use of Chinese character in Japanese and in Chinese. I therefore call Japanese 'ideographic' in its use of Chinese characters (roughly the lexical part of its graphology). Thus for example we find the same character used to translate quite different sounds. The only thing these sounds have in common is their situational relevance, or their 'meaning'. (see Ex. 1 on the example sheet).

Chinese, however, is constant in the use of one character to represent one phonologically identifiable lexical form. It is therefore a 'logographic' script. (see Ex. 2).

8. PHONOLOGY-BASED TRANSCRIPTION

Most other world scripts are related to the interlevel which Edinburgh places between substance and form, that is, the whole relationship lies within that interlevel, whereas in Chinese character languages the relationship stretches on both sides of the formal level. Before examining the different types of sound-translation it is worthwhile making the somewhat rash theoretical statement that phonology-based will inevitably mean 'perception-based'. I know of no case where sounds are articulated identically but perceived as different, but of dozens where articulation varies quite considerably while perception of identity is constant. It therefore seems obvious to me that scripts based on phonology are independent of instrumentally perceptible differences in production,

or, put broadly, phonetic differences. Thus at this end of the spectrum we look more towards form than towards substance.

9. SYLLABLE-BASED TRANSCRIPTION

Chinese turns out to be a candidate for what one might regard as an open-ended syllable system, but in my opinion it fails because (a) there are many cases where syllables identical in timbre and tone still represent separate lexical items, and (b) there seems to be no case where an existing character may be used to represent a newly coined indigenous lexical (perhaps nowadays 'morphemic') item. On the other side it may be said that where Chinese is used to represent foreign syllables, there does exist a syllabic system still to some extent open-ended. The syllables /mjà/ and /mjáŋ/, for example, were created phonologically through the fanchieh system during the Manchu period[10]. Syllabic scripts are, however, normally closed systems. Two major types are in use:

10. TRANSCRIPTION BASED ON A FULLY SYLLABIC SCRIPT

By 'fully syllabic' I mean not in any way perceptibly sub-syllabic in construction. One example of such a syllabary is the Japanese kana, which is realised in two distinct though not entirely dissimilar forms: hiragana, traditionally used to handle morphology of Japanese origin, and katakana, increasingly used for everything but earlier restricted to the transcription of foreign (non-Chinese) words. In such syllabaries the component sounds of a syllable are not visibly represented in translation by any particular part of a character. (See Ex. 3).

11. TRANSCRIPTION BASED ON ALPHABETIC SYLLABARIES

An 'alphabetically syllabic' script is one whose characters reveal correlations between the component sounds in the syllable and parts of the character, usually in a fairly regular and systematic way. Such are, for example, the Indian nagari scripts. In such scripts we can identify what may be called a consonantal element and a vocalic element. (See Ex. 4)

12. MIXED TRANSCRIPTION

There seems to be only one example of a mixed transcription system, where a kana form in Japanese (usually hiragana) is appended to a Chinese character to obtain a complete lexical item from its stem morpheme (translated into Chinese character) and its (bound) inflectional morpheme(s). We are now in a position to define Japanese script as mixed ideographic-fully syllabic. (This system incidentally gives rise to continued oscillation in the otherwise strictly uni-directional nature of reading, producing great strain on the eye; this is not the same thing as overtly reversed script as described earlier - para. 4) (See Ex.5).

12. THE CASE OF ARABIC

Largely on typographical grounds, Arabic has sometimes been held to exemplify a logographic script. It is as true of Arabic as it is of some European handwritings that individual 'letters' or graphemes are not identical in all their combinations. But this is not to say that, as with Chinese, the script is based on lexis. It seems reasonable to class Arabic with Hebrew as a quasi-alphabetic script with some syllabic characteristics, since in some cases vowel-pointing is optional, hence a character has the power

of representing a syllable. (See Ex. 6).

14. ALPHABETS

Diringer's classic work[11] can hardly be compressed into a paragraph or two, but I do not intend to describe all the varieties of approach to translation based on separation of consonant from vowel. Those syllabaries in which 'consonant' and 'vowel' elements can be identified turn out in most cases to have common origins with alphabets. Diringer in fact includes my 'alphabetic syllabaries' as alphabets and so in a diachronic sense they are, having been traced back by him to the Sinaitic script, but I have thought more in terms of discrete characters, or characters in sequence. Hebrew might again appear here as an example of a 'sub-alphabet' with its vocalic elements only optionally translated, ans so be moved out of the syllabic area. There are, of course, inconsistencies, with vaw and yod performing now consonantal, now vocalic functions.

15. ALPHABETIC TRANSCRIPTION OF TONE

Earlier on (para. 6) I referred to the Chinese Nationalist system for translating tone into writing. This system is expounded by Dr. W. Simon in his 1942 handbook[12] and can be compared with other (optional) methods of indicating tone in Roman script by the use of figures (as in the Wade system of transcribing Chinese) or by superposed accents (as in Vietnamese). (See Ex. 7)

16. PHONETIC-PHONEMIC PROBLEMS

Attempts have sometimes been made to produce new alphabets using at least some of the IPA symbols in an attempt to provide emergent cultures with a systematic writing system, perhaps a foolproof one, but in view of the 'non-uniqueness of phonemic solutions', it is clearly impossible to cover all eventualities, not least current changes in the substance. Though it may be in some senses efficient to use as 'phonemic' a solution as possible, there are good reasons to move in a more generously phonetic direction. A moment's thought will assure us that writing denies us a good deal of contextual cueing, hence should provide other types of cue, which in the nature of things must be either phonetic or purely arbitrary in relation to the main syst m.

17. PHONEMIC TRANSCRIPTIONS FOR LINGUISTS.

Abercrombie[13] has some interesting points to make on the ancient history of phonemic transcriptions, pointing out that in earlier centuries in England the term 'letter' was used by scholars much as 'phoneme' is used today. It could be distinguished from the graphic symbol by the use for the latter of the term 'character' as here, though with the restricted meaning 'alphabetic character'. Thus there has been for some four centuries sufficient apparatus to produce so-called 'phonetic spellings' of languages like English. Whilst 'phonetic' transcriptions are used widely in fieldwork (these being the narrowest possible transcriptions available to the investigator until his phoneme system is set up), phonemic or near-phonemic transcriptions are seldom used where a standard

orthography exists. Some use is, however, made in certain areas of applied linguistics, notably in language teaching. (I do not refer necessarily to systems based on IPA or its American equivalent).

18. AN EARLY SYSTEMATIC ATTEMPT

Most linguists (except, of course, Abercrombie[14]) overlook the genius of Isaac Pitman and his predecessor Taylor, whose contribution to linguistic science was at least as great as that of the visible speech men. In Pitman's system not only is he concerned to represent English speech fairly consistently in writing - here of course we exclude the later abbreviational work and think only of the original base-system - but he is also concerned to record similarities in phonetic features, which IPA and similar systems used in phonetics cannot do, based as they are on traditional alphabets in the first instance. Hebrew aspiration points are about the nearest such attempt in traditional scripts. The shorthand systems tend also to resemble Hebrew in the optionality of the inclusion of vowel symbols.

19. PROBLEMS IN DEVISING ORTHOGRAPHIES

During work on two unwritten languages in Africa I became involved personally in a number of problems where decisions affect the type of transcription adopted in a newly literate society. Here are some of the questions we asked:

(i) In cases where two solutions are possible, one will usually be based on grammatical criteria, the other on phonological. Can a blanket decision be made for the adoption of one of these sets of criteria as a priority?

(ii) Is faithfulness to the sounds of the language one is translating into script to have precedence over considerations relating to interintelligibility between it and a neighbouring 'prestige' language?

(iii) Where simple vowels exceed five, or where varieties of consonant exceed those normally found in European languages, or for similar reasons, should IPA symbols be added to the Roman letters? (The 'Africa Alphabet' employs 'Italian vowels and English consonants')

(iv) Have diacritics a place in modern scripts?

20. TRANSCRIPTION FOR WHAT?

The purpose for which the choice of a transcription system is made is of paramount importance. Whether one is providing a first orthography or selecting between existing systems or even providing a new orthography, there is a great difference between use by specialists and by the masses and perhaps as an in-between area, the educated masses. This is very much a matter for sociolinguistic study, but a few principles may be worthwhile suggesting. Apart from specialist use, some Romanised alphabet which uses vowel symbols in much the same way as they are used in Italian is a good beginning. With consonants, though English provides a wide range with which to compare, one is less happy about continuing the use of digraphs like 'ch', 'ph', 'th' and 'sh'. These four provide an interesting set, each offering a different problem. We see immediately that 'ph' is unnecessary, since we have 'f'. With 'ch' the Africa Alphabet has seen the virtue of omitting 'h' with no ambiguity, provided 's' is consistently used for /s/.

It does, however, for some people represent two phonemes and so looks asymmetrical. With 'th' we have ambiguity, and some languages have used it together with 'dh' for the voiced form. There seems no way of avoiding 'sh' while we have 's' operating phonemically, and I don't think we can find any other language besides English with a long-established Roman script which caters for consonant sounds so comparatively simply. The Cyrillic script would be more useful in many ways, but this poses cross-cultural as well as political problems.

Unless a language is tonal, diacritics appear to be unnecessary.

Finally, ad hoc systematic transcriptions may be very useful in teaching languages using one of the types of transcription I have enumerated, to those whose first language employs another.

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3. See his Studies in Phonetics and Linguistics, p.36.

4. Abercrombie, D. Elements of General Phonetics, Edinburgh U.P., 1967:p.17.

5. See Appendix A.

6. Catford, J.C.: A Linguistic Theory of Translation, London: Oxford U.P., p.2

7. Catford, p.13.

8. Catford, p.53.

9. i.e. the interlevel between substance and form, as understood by the Edinburgh school. This interlevel involves both phonology and graphology.

10. Downer, G.B. "Traditional Chinese Phonology" in Transactions of the Philological Society, 1963: p.138, n.2.

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12. Simon, W. The New Official Chinese Latin Script: Gwoyeu Romatzyh, London:Probsthain, 1942.

13. See Studies in Phonetics and Linguistics, pp.76ff.

14. See Studies in Phonetics and Linguistics, pp.92ff.

EXAMPLES OF ORTHOGRAPHIC TRANSCRIPTION IN NATURAL LANGUAGES

1. Japanese language. Partly ideographic. The "Chinese" character 話 depends on context for its reading:

   (a) 話す hana-(su) (b) 会話 (kai)-wa

   The relationship is not phonological

2. Chinese language. Logographic script. The Chinese character has only one reading, which has a phonological exponent, e.g.

   冬 / dəŋ /, on "tone 1'" ('high,level")

   The reading does, of course, vary across varieties of Chinese, but this is generally true for all scripts. The point is that, within one variety, the phonemic value is constant.

3. Japanese language. Partly "fully syllabic". Taking hiragana as the example, we find no visible representation of component consonantal or vocalic elements by any part of a character, thus:

   (a) no consonantal representation:

   か ka け ke き ki こ ko く ku

   (b) no vocalic representation:

   か ka た ta ま ma ら ra さ sa

4. Hindi language. Alphabetic syllabary. Constant element /k/ is visible:

   क /kə/ का /ka/ के /ke/ कि /kI/ की /ki:/
   को ko/ कु /ku/

5. Japanese language. Mixed transcription, types 1 and 3 above, e.g.:

話さない hana-sa-na-i

where hana- is ideographic, the others syllabic.

6. Arabic script provides ambiguities in vowel quality:

ﻣﻲ /mɛi/ ﻣﺲ /məi/ /mɪ/

Hebrew script traditionally omitted vowel symbols, or used semi-vowels ambiguously:

בת / bat/ מימו /mimo/,/mimu/,/memo/,/memu/

7. (a) Chinese language. A fairly recently invented script, with tone indicated through alphabetic character, as opposed to the use of numerals or diacritics:

	Examples	Tones
chuan da	feng	high level
chwan dar	ferng	high rising
choan daa	feeng	low rising
chuann dah	feng	high falling

(b) Chinese language. The traditional Wade system of Romanisation would spell the above identically for each type (i.e., ch'uan; ta; fêng) and add a superscript number to represent the tone, e.g.: choan = ch'uan^{3}.

(c) Vietnamese language. Here both vowel quality and tone are represented by diacritics, e.g.:

sắc where ´ = high rising; ˘ = lip-spreading

huyền where ` = low falling; ^^ = fronted

DIAGRAM OF 'FRAMEWORK OF LEVELS'
IN EDINBURGH SCHOOL LINGUISTIC THEORY

Subject Concerned:	Phonetics		Linguistics		
Level (general):	SUBSTANCE (phonic or graphic)	relation of form and substance	FORM	CONTEXT (relation of form and situation)	situation (non-linguistic phenomena)
Level (specific):	PHONETICS	PHONOLOGY	GRAMMAR AND LEXIS	SEMANTICS	
	SCRIPT	'GRAPHOLOGY' (writing system)			

- taken from Halliday, M.A.K. et al: The Linguistic Sciences and Language Teaching, Longmans, London, 1964, p.18.

SUMMARY OF MODES OF TRANSCRIPTION IN NATURAL LANGUAGES

A. SEQUENCE

1. Unidirectional parallel sound-symbol sequence at the level of the unit selected.
2. Interrupted sequence:
   (a) omission of symbol, e.g. 20th August
   (b) Reversal of symbols, e.g. 2 million

B. MATCHING SYSTEMS

1. One sound, one meaning, one character.
2. One sound, one character, diverse meanings.
3. One sound, one meaning, diverse characters.
4. One meaning, one character, diverse sounds.
5. One sound, diverse meanings represented by corresponding characters.
6. One meaning, diverse sounds represented by diverse characters.
7. One character, representing diverse sounds with corrreponding meanings.

EXAMPLES OF THE SYSTEMS

1. Unambiguous matter and most natural language samples at lexical level. The term "sound" is of necessity imprecise. In most systems it will represent that unit of sound which correlates with an average minimum free morpheme, a "word". Meaning is lexical, referential meaning.
2. Homographs, e.g. English "rose"
3. "Spelling differences" within one variety, e.g. English sympathise, -ize; judgment, judgement, show minimal variations here; the most radical type is that found in

Japanese "homologs" like

会 and 合 , both read as a(-u), "to meet"

4. Japanese character exemplifies this: 話 = hana (-su) or (kai-)wa, according to context.
5. Homophones, e.g. English read, red; pair, pear, French poing, point, etc. and similar cases in most languages, especially Japanese and to some extent Chinese (within tones).
6. "Homosemes" such as donkey/ass perhaps, if we concede a measure of imprecision for "meaning". All languages are involved.
7. "Symbols" such as "2" read in English as "two", "half", "seco-", "twen.-" etc. and all similar figures. Likewise, those homographs which show variant readings, e.g. English lead, read as /l i:d/ or /l ɛ d/.

C.V. Taylor